Food Residuals Management Issue Paper
2001 JTR Recycling Market Development Roundtable
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Introduction:
To understand the food residuals waste stream, we need to first look at the total waste stream in the U.S. In 1999, 229 million tons of municipal solid waste (msw) were generated from residential, commercial, institutional and industrial sources. That equates to 4.62 lbs per person per day. Of that we recycled 27.8%, landfilled 55% and incinerated 17%. The US EPA has set a goal to recycle 35% of the waste stream by 2005. Food residuals make up about 10.1% of the msw waste stream that is produced by consumers or 21.9 million tons. Food residuals are the single largest component of the waste stream in the U.S. by weight. (The paper category has a larger percentage, but if you look at each individual type of paper– old corrugated paper, white paper, newsprint, etc., food is the largest single component.) If we look at other countries, especially developing countries, that percentage is even higher– 30-50% of the waste stream and therefore, the technological solutions that the U.S. develops may be of even greater importance for other countries in the world.

Current Situation:
Currently, the U.S. only recovers 2.6% of the food residuals waste stream. Compare that to other curbside recyclables that have recycling percentages at 5-65%. When we look at what actually gets disposed, that is subtracting out recycling from the generation of waste, food waste makes up 14% of all waste that actually is disposed in the United States. That means in order to meet the 35% recycling rate in 2005, we will need to increase our food recovery/recycling rate to 13.2%.

In order to understand the food residuals problem, we need to look at it from the production point of view as well as the waste generation point of view. Based on the April 1998 report "Waste Not Want Not" that was produced by USDA and US EPA jointly, 27% of all food that is produced (grown, raised, harvested and marketed) is thrown away. That is 96 Billion lbs. of food wasted in the United States every year. Stated another way, that is 300 lbs of food per person per year or a little more than 3/4 of a pound of food per person per day. It is estimated that the value of this food is 31 Billion dollars, and if just 5% of this food was recovered, we could feed 4 million people a day. Looking at the disposal side of this wasted food, it costs 1 Billion dollars a year to dispose of this food.

<u>Sources of food residuals and rates for specific sectors</u>
The sources of the wasted food are: food that is left in the fields from natural disasters, disease, or missed harvesting; processing waste from food processors and handlers; wholesale market spoils from transportation, handling; pre-consumer waste from food preparation at restaurants, caterers, etc.; prepared food distributors (fruit and vegetable peels, meat scraps, etc.) and post-consumer waste from plate waste and preparation waste.

In supermarkets the organic waste portion of the waste stream is 75-90%, schools and restaurants

74% and dairies are looking for alternatives to discharging their wastes to the waste water treatment plants. Additionally, a study compiled by Draper and Lennon Associates estimated the following generation rates: schools 0.35 lbs/meal; health care 0.6 lbs/meal; prisons 1 lb/inmate /day, conferences 0.6 lbs/meal and supermarkets 3,000 lbs/employee/ year.

Food residuals management hierarchy

In the "Waste Not Want Not" publication (EPA 530-R-99-040 or CALL 1-800-GLEAN IT) a food residuals management hierarchy was established: feed the hungry, feed the animals, use for industrial purposes (fats rendered for animal feed, soaps and cosmetics), compost and dispose. The first three levels of the hierarchy are managed by the USDA, but need coordination with the environmental solid waste agencies so that the residuals can be managed as high up on the hierarchy as possible and to manage the residuals that come from these three areas of the hierarchy.

First, feeding the hungry. The USDA food security initiative works to feed the 36 million Americans (14 Million of whom are children) who are food insecure. That is 10% of all households that are food insecure with 21 million Americans who depend upon charitable food donations from organizations such as Second Harvest (the national food bank organization). There are four areas in the food distribution chain where the food can be recovered and in each of these areas there are *food residuals*– food that is inedible or could not make it in time to a consumer– that must be managed.

1. Field gleaning is the recovery of food from crops that have been missed in the harvesting either in the fields or the packing sheds. Not all of these gleaned foods are salvageable.
2. The wholesaler, where foods are sold to market or distributers at the wholesale level. Foods that are edible, but have not been bought at the wholesale market can be picked up for distribution to the food banks, inedibles also need to be managed.
3. Perishable and prepared foods from restaurants, cafeterias, airlines, caterers, hospitals, special events.
4. Nonperishable food recovery of processed foods with relatively long shelf lives such as canned foods. Out of date nonperishable foods can create some of the greatest difficulties in management as they need to be "de-packaged" if they are to be composted.

The foods recovered in these different areas are distributed by food banks, that also in the handling and storage, create food residuals that must be managed.

The second level of the hierarchy is feeding animals. There is nothing new here, food residuals have been collected and fed directly to pigs over the last century. The only new requirement is to cook residuals if they contain meat or animal materials. (This is how the hoof and mouth disease entered Britain– from a foreign slop supply containing meat bi-products that were not properly cooked). Additionally, food residuals are collected, heated and extruded into pellets for pet food. It is important to note that the price of corn has effected the viability of the pelletized food residual, pet food market. Corn prices were at a 12 year low in 1999 and at such depressed prices

food residuals cannot compete with corn for the pet food market.

The third level of the hierarchy is using food residuals for industrial purposes. Meat scraps, bone and fats are typically separated at the butchers facility and collected in 55 gallon drums. In the past, the industrial rendering facilities paid the butchers or meat processors for these residuals and used them to make soaps, cosmetics and animal food. There has been a significant decline in the rendering industry, and grocery store butchers and other meat processors are now having to pay ($25-300/barrel) to dispose of meat and fat scraps. In rural areas, the lack of industrial renders has created a significant problem of how to dispose of these materials. The American Association of Meat Producers is looking at composting as an alternative to rendering.

The fourth level of the hierarchy, composting of food residuals that are not fit for the hungry, animals or industrial purposes is where EPA has concentrated its work on the management of food residuals. EPA is concerned about food residuals in the landfill because they decompose rapidly, form leachate and result in methane gas, a powerful greenhouse gas. The organic acid leachate created by decomposition of food residuals also leaches metals from the waste in the landfill. Food residuals have a low BTU value as they are a wet waste, and if they are incinerated, nitrogen oxides emissions increase at the incinerator.

Finally the fifth level of disposal in a landfill or incinerator, which for reasons stated above is not preferable.

The benefits of compost

Using food residuals for compost has several environmental as well as economic benefits. Compost is a valuable resource which can reduce the amount of fertilizer, fungicide and pesticide that is needed on crop land, thus reducing the need for chemicals manufacture and application and potential for air and water pollution from excess runoff. Compost increases the nutrients in the soil, and it can decrease the erosion and compaction of soil. With global climate change predictions of more drought and flooding conditions, the addition of compost to compacted river banks may be an effective adaptation strategy to reduce the negative impacts of river flooding and increase the soil capacity to absorb water and decrease storm run-off. In a recent study of a river bank in Iowa where flooding occurred, it was found that soil compaction was a major factor in the river flooding where it never had before. It was theorized that the addition of compost to the river bank could significantly reduce the damage due to flooding of this river in the future. Compost has also been proven to be an effective pollution remediation technique for contaminated soils.

The greenhouse gas benefits of composting food wastes has been estimate to be better than that of composting yard trimmings, with a reduction of methane from the landfill and a value of -0.20 million metric tons of carbon equivalent. It is estimated that composting of the 21.5 million tons of food residuals would reduce 3 million metric tons of carbon equivalent or would be the same as taking 2 million cars off the road. This estimate does not take into account the potential additional greenhouse gas benefits of carbon sequestration in the soils that are amended

with compost.

Composting of food residuals is the largest area for food residuals diversion after food rescue for human consumption as the animal feed and rendering markets are declining. It has been estimated by EPA that the market for high quality finished compost is larger than the supply and that 800 million tons of finished compost could be produced. This compost would have applications in agriculture, silviculture, residential applications, nurseries and landscaping.

Governments' role for composting and example programs

There are a few regulatory incentives in place around the country: Massachusetts is looking to ban food residuals from disposal in 5-10 years and is trying to set up capacity to compost now; North Carolina has a grant program and an Governor's executive order, California has diversion goals, San Francisco is collecting food wastes curbside, and Nova Scotia has a mandatory wet and dry collection system. There are also other international models. The Netherlands has been collecting about 1.5 tons of vegetable-garden-fruit since 1994 (85% organic waste recycling) and composts it at 23 facilities (anaerobic digestion), producing compost at half the cost of incineration. In Italy, 500 municipalities are collecting kitchen waste in biodegradable bags. In Japan (where tip fees are $250-600/ton), they are introducing kitchen disposals for food residuals management, an Organics Recycling Association was established in August of 2000 in Japan, and a delegation of 15 Japanese came to the BioCycle food residuals conference in August of 2000. In Korea (where tip fees are $80-350/ton and food will be banned from landfills), food is collected in bags under a food separation rule that is enforced, and 30% of the food that was collected in Seoul, Korea was recycled into animal feed or fertilizers. In Hong Kong, 30% of municipal solid waste food waste, and they are planning to establish a large composting facility.

Barriers and Opportunities:

In this country, there are still barriers to food residuals collection and processing. For the composter, some barriers in the processing are: odors, residues, leachate collection, impervious surfaces, prevailing winds, plastics, packaging, twist ties, plastic berry boxes, glass, labeling of waxy corrugated containers in different languages and getting wax off of OCC. Regulatory barriers include no consistency in the siting and operation standards, objection by Boards of Health for food born pathogen and odor concerns, NIMBY, length of time to get permits and on the competition side, tip fees at landfills not high enough to make it economically viable to compost the food residuals unless you are on the East or West Coast or if your operation is underwritten by a major corporation (e.g. Nestle and the New Milford Farm in CT) and tip fees for food are not well established. On the generator side (e.g. grocery stores), it takes an investment in containers, compactors, and space as well as training of the employees (in businesses with high turn over rates and low profit margins), and these costs are compared to the standard disposal costs. If biodegradable bags are used in the collection, the problem is the supply of these bags has not kept up with demand. Additionally, the generators have to find haulers who are willing to haul the putrescibles and to pick up on a high frequency rate. This in many cases means that the hauler needs to create milk runs to pick up several small accounts to make the hauling worthwhile. Also, a general lack of communication between the hauler and

generator has been cited as a barrier as the hauler needs to let the generator know if they are not producing enough waste to make the run profitable. In turn, the hauler wants to have long term relationships with composters to ensure that they have a guaranteed market for these residuals.

These barriers also create opportunities for enhancing the food residuals market. Some ideas that have been generated, from both the August conference as well as a recent Northeast recycling Council meeting, are:

- Get solid waste professionals to work with Departments of Agriculture and Health in order to create markets that follow the food residuals hierarchy.
- Use the new EPA manure management regulations to create an incentive for composting.
- Create uniform standards and labeling for compost.
- Promote the use of compost in state and federal projects (create specifications for it's use in transportation projects, disease control, remediation, etc.) and create a subsidy for its use over the use of topsoil (promulgate top soil removal bans).
- Educate food generators on how much it costs to dispose (full cost accounting) and the benefits of donating. Document full cost of food diversion vs. disposal.
- Market positive information coming from organizations such as the Florida Organics Recycling Center for Excellence.
- Incorporate food residual recovery into the dairy industry as an alternative to discharge to WWTP which has caused compliance problems.
- Create infrastructure needed to help food management to deal with food recalls.
- Develop and use biofilters and other odor control devices.
- Create regulatory and other incentives from government (bans, grants, global climate change connection) to encourage food waste diversion.
- Influence the design of grocery stores, processing plants, etc. to accommodate food diversion.
- Define best management practices for food residuals management (i.e. no landfilling because of leachate, no incineration because of increased NOx) and for collection and composting (i.e. types of pads for local conditions and feedstock; hauler removal of plastics; trommel size, etc.).
- Make connections/directory for alternatives to disposal (food banks, animal feed, composting).
- Create communications networks between haulers, generators and composters.
- Educate environmental groups on this issue to help with public awareness.
- Create central facilities for product recovery– de-containerizing, crushing cans, removing product (like a materials recovery facility for food) and coordinate Second Harvest, GMA, and FMI to work on this.
- Work with other waste streams that could serve as a needed balance for a proper carbon to nitrogen ratio.

Current Projects:

Projects supported by EPA New England:

- August 2000, EPA New England– Food Residuals management conference. 250 international participants. Conclusion: food composting has come from pilot stage into successful operations, but many barriers still to overcome.
- March 2000, 2001, MA Stakeholders Summits– trying to interest municipalities in siting composting and generators in starting to separate and collect. Several connections and new projects were created at the March 2001 summit.
- 2000, Metro Boston Creation of infrastructure– a compost site and collection infrastructure.
- Completed– Decentralized on-farm food waste composting project diverting 175 tons per week. Project summaries available.

Other projects around the country, not already mentioned:

- Fletcher Allen Hospital in VT– residuals to a farm
- Larry's Market in Washington– food residuals to a top soil facility
- Wyndham Franklin Plaza Hotel in Philadelphia– food residuals to a pig farmer
- Mohegan Sun Casino in CT– food residuals to farmers and considering anaerobic digesters
- New York Department of Corrections– on-site composting
- Middlebury College cafeteria waste to compost (created an automated bin cleaning operation)
- New England Culinary Institute– Collects scraps from the culinary institute and goes to a compost farm where 70 Austrolorp chicken feed on them, scratching and aerating the pile and depositing manure (enriching the pile) and produce eggs. Cost savings to the institute of $300/month over going to the landfill. Saves 10-20% of waste bill.
- New Jersey composter who works with the grocers to identify where the food residuals are coming from (i.e. portion of bakery waste consistently is high) to reduce the amount of food residuals in exchange for a contracted up front tip fee, that is competitive with the trash top fee, that remains constant. Composter has been able to reduce number of tips at the stores by one third.
- BioCycle's annual report on food residuals composting is in August editions and is the best single source to keep informed on this commodity.

Organizations interested in the food residuals management issues

Food Manufacturers Institute (FMI)
Grocery Manufacturers Association (GMA)
Colleges and Universities Food Services
Food Processors Institute
Hauler Associations
United States Department of Agriculture (USDA)
Second Harvest and other food bank associations

The American Association of Meat Producers
United States Composting Council

Session Outline:
1. Overview of discussion paper (10 min)
2. Individual participant feedback - each participant will state the single most important barrier or need to expand market from their perspective (15 min)
3. Discussion - Additional information / issues for consideration (20 min)
4. Participant feedback - each participant will state the single most important opportunity for collaboration from their perspective (15 min)
5. Discussion - Potential collaboration/projects to address barriers (60 minutes)